ORDER NO. ARD82080186C2-09

# Service Manual

Mini Cassette

## RQ-J20X

(Dark Gray)

World's First dbx-Equipped
Stereo Cassette Player

This is the Service Manual for the following areas.
[D] ····· For all European areas.

### RQ-2720 MECHANISM SERIES

## Specifications

| | |
|---|---|
| Power requirements: | AC; with optional AC adaptor RP-31 |
| | Battery; 3 V (two R6 size dry batteries) |
| | Rechargeable battery; with optional rechargeable battery pack RP-009 |
| Track system: | 4-track 2-channel stereo playback with included stereo headphones |
| Tape speed: | 4.8 cm/s |
| Dynamic range: | More than 97 dB (at 1 kHz), with dbx* in |
| Signal-to-noise ratio: | dbx in; 81 dB |
| | dbx out; 56 dB |
| | (A weighted, 3 % THD at 1 kHz) |
| Fast forward and rewind time: | Approx. 120 seconds with C-60 cassette tape |
| Input: | DC in; 3 V |
| Output: | Headphones; output level 630 mV (16 Ω)/CH |
| Head: | 1 LH head for stereo playback |
| Dimensions: | 88.0 mm (W) × 138.0 mm (H) × 27.1 mm (D) |
| Weight: | 340 g, without batteries |

Specifications are subject to change without notice
* The term dbx is a registered trademark of dbx Inc.

Panasonic

**Matsushita Electric Trading Co., Ltd.**
P.O. Box 288, Central Osaka Japan

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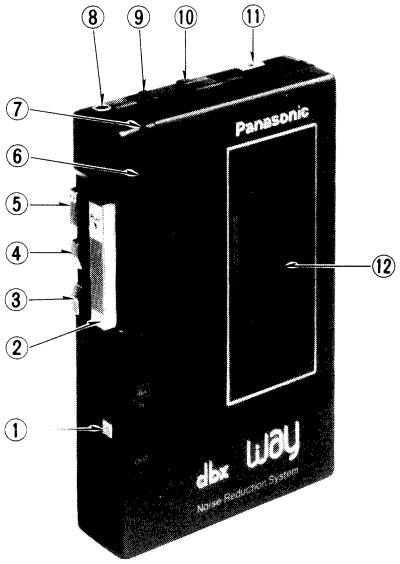
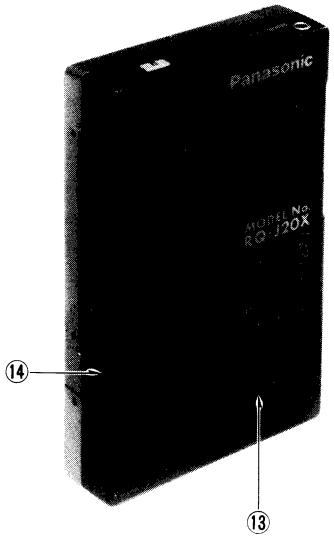
# LOCATION OF CONTROLS AND COMPONENTS




① dbx IN/OUT switch
② Playback button
③ Fast forward/cue button
④ Rewind/review button
⑤ Stop/eject button
⑥ Built-in microphone
⑦ Battery-check lamp
⑧ Headphones jack
⑨ Tape selector (Metal L/Metal H, Normal L/Normal H)
⑩ Pause/mic on switch
⑪ Volume control
⑫ Cassette compartment cover
⑬ Battery cover
⑭ DC IN jack

# DISASSEMBLY INSTRUCTIONS

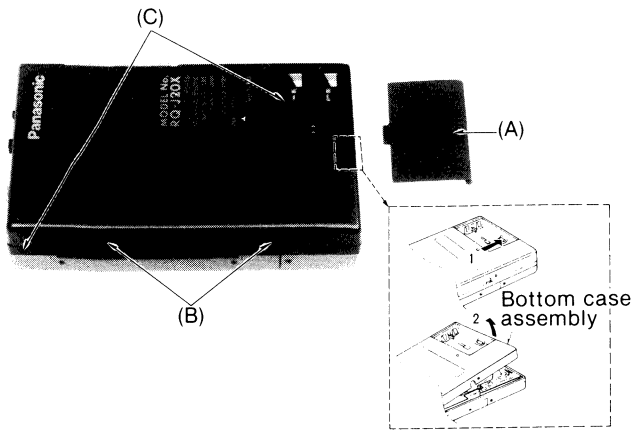



Fig. 1

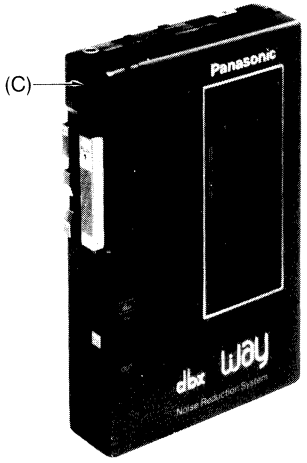



Fig. 2

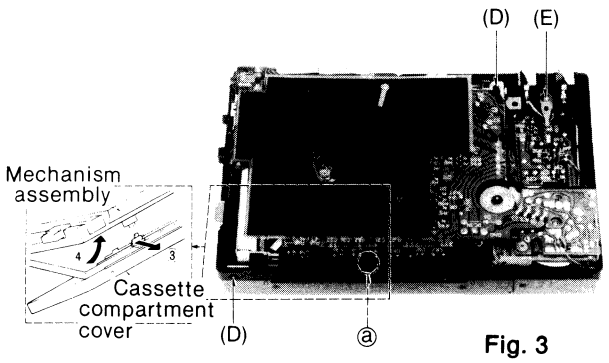



Fig. 3

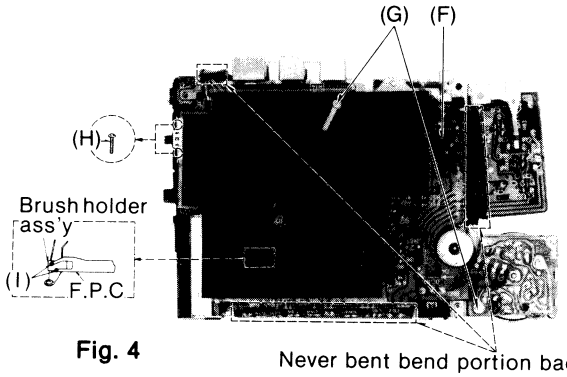



Fig. 4

Never bent bend portion back.

| Ref. No. | Procedure | To remove | Remove | Shown in fig. |
|---|---|---|---|---|
| 1 | 1 | Bottom case assembly | · Battery cover ····· (A)<br>· 2 screws ····· (B)<br>· 3 black screws ····· (C)<br>· As shown in fig. 1, push the claw in the direction of arrow ①, then lift bottom case assembly in the direction of arrow ②. | 1<br>1<br>1, 2<br>1 |
| 2 | 1 → 2 | Main case assembly | · 2 screws ····· (D)<br>· 1 red screw ····· (E)<br>· First, press the stop/eject button, and open the cassette compartment cover. Press the playback button, and push the mechanical assembly up in the direction of arrow ④ while pulling portion ⓐ in the direction of arrow ③, as shown in Fig. 3. Then, the main case assembly can be removed. | 3<br>3<br>3 |
| 3 | 1 → 2 → 3 | Main circuit board and motor governor circuit board | · 1 red screw ····· (F)<br>· 2 screws ····· (G)<br>· 2 black screws ····· (H)<br>· Unsolder the soldered portion of the brush holder assembly ····· (I) | 4<br>4<br>4<br>4 |

# CHIP PARTS REPAIR PROCEDURE

## (transistor, diode, resistor and capacitor, etc.)

### A. Removal

1. Remove all solder from both ends of chip using a solder sucker (RP8062) or desoldering wick.
2. While the chip is hot remove it by turning with tweezers, as shown in fig. 1.
   * Make sure that the unit is turned OFF when checking the resistance and polarity of a chip.

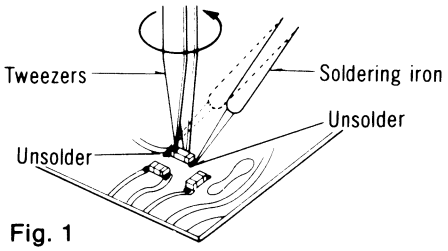



Fig. 1

### B. Mounting

Place solder on the foil chip mounting, and solder the chip while applying the soldering iron in the direction of the arrow, as shown in the diagram (fig. 2).

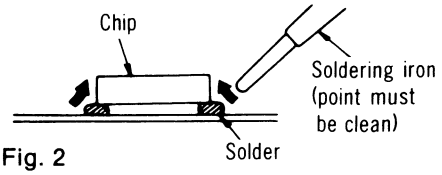



Fig. 2

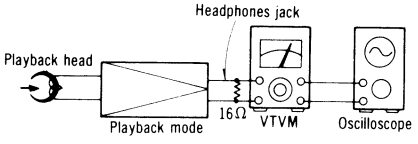
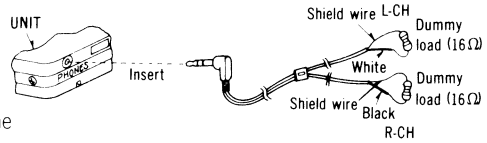
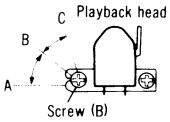
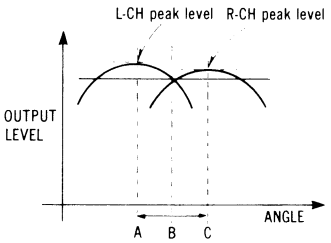
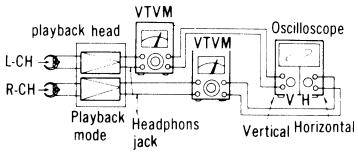
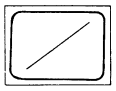
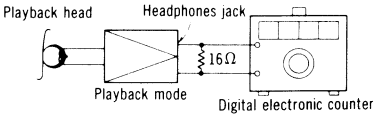
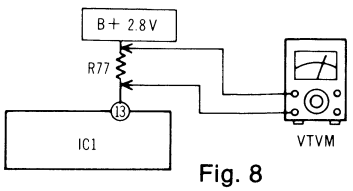
### C. Precautions in mounting the chip

1. Do not heat the chip beyond 3 seconds.
2. Do not rub the electrode.
3. Use tweezers to prevent any damage to the surface.
4. It is recommended that a pencil-type soldering iron be used.
5. Maintain temperature control under 260°C (500°F) when soldering.
   * Chip resistance (of not more than 100Ω) may vary greatly with the direction of mounting; therefore, mount the white side on the pattern side.
6. Do not re-use the tantalum capacitors or ceramic capacitors after removal (use new components).
7. Do not subject the components (chips) to excessive stress.

# MEASUREMENT AND ADJUSTMENT METHODS

NOTES:

- Make sure head is clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature: 20 ± 5°C (68 ± 9°F)
- Volume control: Maximum
- Tape select switch: Normal (Hi)
- Pause switch: OFF
- dbx switch: OUT

| ITEM | MEASUREMENT & ADJUSTMENT |
|---|---|
| **Head azimuth adjustment**<br>Condition:<br>* Playback mode<br>Equipment:<br>* VTVM * Oscilloscope<br>* Test tape (azimuth) ··· QZZCFM<br>* Stereo M3 plug<br>* Resistor (16Ω) | **L-CH/R-CH output balance adjustment**<br>1. Make connections as shown in fig. 1 and 2.<br>2. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (B) in fig. 3 for maximum output L-CH and R-CH levels. When the output levels of L-CH and R-CH are not at maximum at the same time, readjust as follows.<br>3. Turn the screw shown in fig. 3 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate the angle B between angles A and C, i.e., a point where L-CH and R-CH output levels come together at maximum (Refer to figs. 3 and 4).<br>  <br>Fig. 1<br>  <br>Fig. 2<br>**L-CH/R-CH phase adjustment**<br>4. Make connections as shown in fig. 2 and 5.<br>5. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (B) shown in fig. 3 so that pointers of the two VTVMs swing to maximum and a waveform as illustrated in fig. 6 is obtained on the oscilloscope.<br>  <br>Fig. 3<br>  <br>Fig. 4<br>  <br>Fig. 5<br>  <br>Fig. 6 |
| **Tape speed accuracy adjustment**<br>Condition:<br>* Playback mode<br>Equipment:<br>* Digital electronic counter or frequency counter<br>* Test tape ··· QZZCWAT<br>* Stereo M3 plug<br>* Resistor (16Ω) | **Tape speed accuracy**<br>1. Test equipment connection is shown in fig. 2 and 7.<br>2. Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to frequency counter.<br>3. Take measurement at middle section of test tape.<br>4. Measure this frequency.<br>5. On the basis of 3,000Hz, determine value by following formula:<br>$\text{Tape speed accuracy} = \frac{f - 3{,}000}{3{,}000} \times 100\,(\%)$<br>where, f = measured value<br>**Standard value: ±2.5%**<br>  <br>Fig. 7<br>6. If measured value is not within standard, adjust tape speed adjustment VR (shown in electrical parts location), so that frequency becomes 3,000Hz. |
| **Attack recovery time adjustment**<br>Condition:<br>* Playback mode<br>Equipment:<br>* VTVM<br>* Test tape ··· QZZCFM | 1. Test equipment connection is shown in fig. 8.<br>2. Set dbx switch to IN.<br>3. Playback the test tape (QZZCFM: 315Hz/0dB).<br>4. Read voltage on VTVM.<br>**Reference value: 15 ± 0.5mV**<br>  <br>Fig. 8<br>5. If measured value is not within reference, adjust VR1 (shown in electrical parts location). |

| ITEM | MEASUREMENT & ADJUSTMENT |
|---|---|
| **Channel balance adjustment**<br>Condition:<br>* Playback mode<br>Equipment:<br>* VTVM<br>* Test tape ··· QZZCFM | **Level difference adjustment for pre-amp and dbx IC (AN6291)**<br>1. Test equipment connection is shown in fig. 9.<br>2. Set volume control (VR2) to maximum and dbx switch to IN.<br>3. Playback the test tape (QZZCFM: 315 Hz/0 dB), and using VTVM measure the output level.<br>4. Perform measurement for both channels.<br>5. Check that the measured values for both channels are in a range of 22.4 mV (−33 dB) to 31.6 mV (−30 dB), and that the level difference between channels is 3 dB or less.<br>6. If the measured values do not meet the above requirements, the following adjustment is required. The playback output and level difference between channels of the RQ-J20X can be adjusted by controlling the playback gain of the pre-amp.<br><br>**Procedure:**<br>L-CH and R-CH playback gains change as shown in table 1 according to open/short circuit at connection points Ⓑ, Ⓒ, Ⓓ, Ⓔ, Ⓕ and Ⓖ on the main circuit board (fig. 10).<br>For level difference adjustment, open or short the connection points by soldering so that the output level difference between L-CH and R-CH is minimal. |

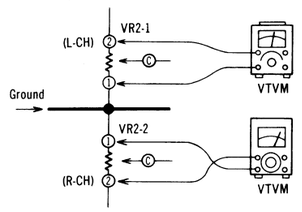



Fig. 9

| Connection point Ⓑ | Connection point Ⓒ | Connection point Ⓓ | R-CH output level |
|---|---|---|---|
| Open | Open | Short | 2 dB up |
| Short | Open | Open | 4 dB up |
| Open | Short | Open | 6 dB up |
| Short | Short | Open | 9 dB up |

| Connection point Ⓔ | Connection point Ⓕ | Connection point Ⓖ | L-CH output level |
|---|---|---|---|
| Open | Open | Short | 2 dB up |
| Short | Open | Open | 4 dB up |
| Open | Short | Open | 6 dB up |
| Short | Short | Open | 9 dB up |

Table 1

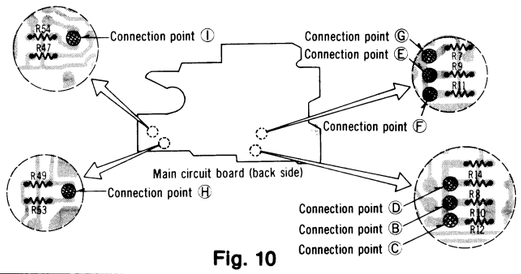



Fig. 10

| ITEM | MEASUREMENT & ADJUSTMENT |
|---|---|
| **Channel balance adjustment**<br>Condition:<br>* Playback mode<br>Equipment:<br>* VTVM * Oscilloscope<br>* Test tape ··· QZZCFM<br>* Stereo M3 plug<br>* Resistor (16 Ω) | **Level difference adjustment for headphones-amp**<br>1. Test equipment connection is shown in fig. 1 and 2.<br>2. Set volume control to 5, tape selection switch to normal (Hi) and dbx switch to OUT.<br>3. Playback frequency response test tape (QZZCFM), and using VTVM measure the output level at headphones jack.<br>4. Make measurement for both channels.<br>5. Check output if level difference between L-CH and R-CH is within 2 dB.<br>L-CH output level − R-CH output level = ±2 dB<br>If the measurement value do not meet the standard value range, adjust as described below.<br>6. L-CH and R-CH playback output balance adjustment of RQ-J20X is done by adjusting the gain of the L-CH and R-CH headphones amplifier.<br><br>**Procedure:**<br>L-CH and R-CH output level changes as shown in table 2 by opening or shorting connection points Ⓗ and Ⓘ on the main circuit board (fig. 10) by soldering. So open or short the connection points so that the output level difference between L-CH and R-CH is minimized. |

| Connection point Ⓘ | R-CH output level |
|---|---|
| Open | Up ↕ Down |
| Short | |

| Connection point Ⓗ | L-CH output level |
|---|---|
| Open | Up ↕ Down |
| Short | |

Table 2



| ITEM | MEASUREMENT & ADJUSTMENT |
|---|---|
| **Confirmation of dbx decode effect**<br>Condition:<br>* Playback mode<br>Equipment:<br>* VTVM * ATT<br>* AF oscillator<br>* Stereo M3 plug<br>* Resistor (16 Ω) | 1. Remove three lead wires of head by desoldering.<br>2. Test equipment connection is shown in fig. 2 and 11.<br>3. Set dbx switch to IN.<br>4. Load a cassette tape (to defeat auto-stop function), and set the unit to playback mode.<br>5. Supply 315 Hz signal from AF oscillator through ATT (for −78 dB attenuation) to head lead wire terminal (on FPC) (for both channels) as shown in fig. 12.<br>6. At this time, measure output level, and adjust measured value to 50 mV by adjusting volume control (VR2).<br>7. Next, attenuate 315 Hz signal by −66 dB and −86 dB, and measure output levels when these signals are inputted.<br>8. Perform measurement for both channels.<br>9. Check that the measured values meet the requirements in the dbx decode effect table.<br><br>**dbx decode effect table**<br>Input signal / Measured value<br>−76 dB (315 Hz) / 0 dB (50 mV)<br>−66 dB (315 Hz) / +20±3 dB (500 mV)<br>−86 dB (315 Hz) / −20±3 dB (5 mV) |

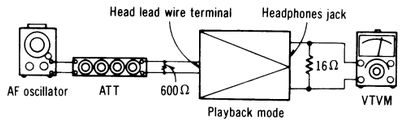



Fig. 11

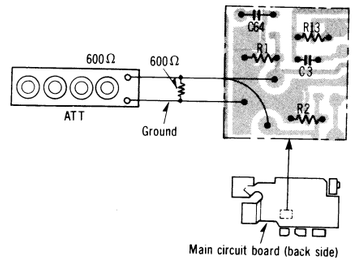
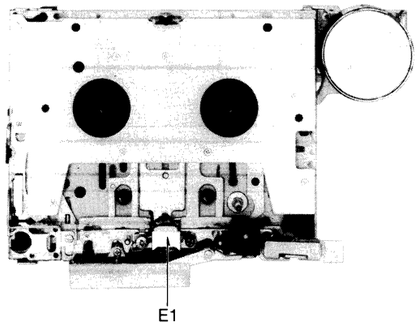
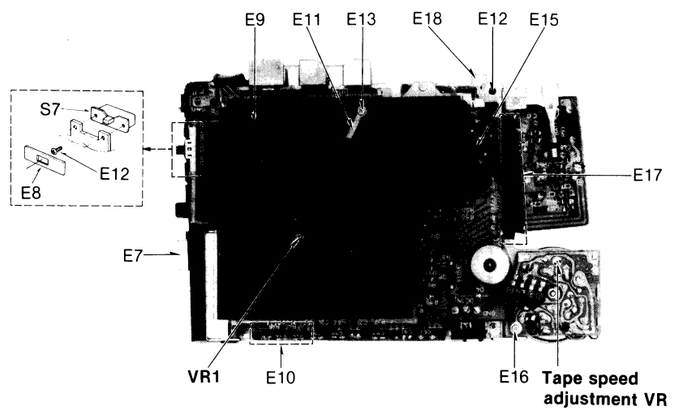
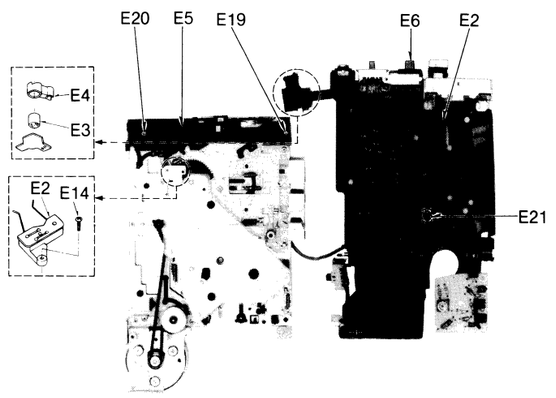



Fig. 12

# ELECTRICAL PARTS LOCATION




**REPLACEMENT PARTS LIST**

| Ref No. | Part No. | Part Name & Description |
|---|---|---|
| | | **ELECTRICAL PARTS** |
| E 1 | QWY4142Y | Playback Head |
| E 2 | QES1533 | Brush Holder Assembly |
| E 3 | WM034BZ103 | Condenser Microphone |
| E 4 | QKJ0502 | Microphone Holder |
| E 5 | QKJ0501 | Holder |
| E 6 | QGT1562 | Switch Knob (for Pause) |
| E 7 | QYT0639W | Volume Knob |
| E 8 | QQC1735 | Shelter |
| E 9 | QTS1590 | Shield Plate |
| E 10 | QBH0081 | Insulating Sheet |
| E 11 | QTD1258 | Lug Terminal |
| E 12 | XQN16+A3FZ | Screw ⊕1.6×3 |
| E 13 | XQN16+A35FR | Screw ⊕1.6×3.5 |
| E 14 | XQN16+C4FY | Screw ⊕1.6×4 |
| E 15 | XTNQ16C4FFR | Screw ⊕1.6×4 |
| E 16 | QHQ1320 | Step Screw |
| E 17 | QBH0180 | Protection Sheet |
| E 18 | QYT0654 | Switch Knob (for dbx) |
| E 19 | XTNQ16C28F | Tapping Screw ⊕1.6×2.8 |
| E 20 | XTNQ16A3F | Screw ⊕1.6×3 |
| E 21 | QTW1242 | Insulating Sheet |

VTVM

VTVM

is required.
justed by control-

it at connection

he output level

| | L-CH output level |
|---|---|
| | 2 dB up |
| | 4 dB up |
| | 6 dB up |
| | 9 dB up |

ut level at

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the gain of the

on points Ⓗ and
nts so that the

| H output level |
|---|
| Up ↕ Down |

| ITEM | MEASUREMENT & ADJUSTMENT |
|---|---|
| **Confirmation of dbx decode effect**<br>Condition:<br>* Playback mode<br>Equipment:<br>* VTVM * ATT<br>* AF oscillator<br>* Stereo M3 plug<br>* Resistor (16 Ω) | 1. Remove three lead wires of head by desoldering.<br>2. Test equipment connection is shown in fig. 2 and 11.<br>3. Set dbx switch to IN.<br>4. Load a cassette tape (to defeat auto-stop function), and set the unit to playback mode.<br>5. Supply 315 Hz signal from AF oscillator through ATT (for −78 dB attenuation) to head lead wire terminal (on FPC) (for both channels) as shown in fig. 12.<br>6. At this time, measure output level, and adjust measured value to 50 mV by adjusting volume control (VR2).<br>7. Next, attenuate 315 Hz signal by −66 dB and −86 dB, and measure output levels when these signals are inputted.<br>8. Perform measurement for both channels.<br>9. Check that the measured values meet the requirements in the dbx decode effect table.<br>**dbx decode effect table**<br>Input signal / Measured value<br>−76 dB (315 Hz) / 0 dB (50 mV)<br>−66 dB (315 Hz) / +20±3 dB (500 mV)<br>−86 dB (315 Hz) / −20±3 dB (5 mV) |

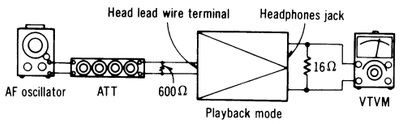



Fig. 11

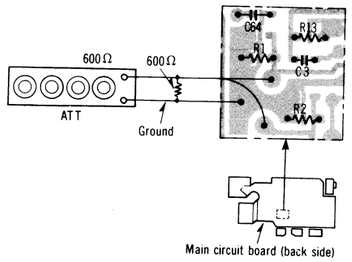
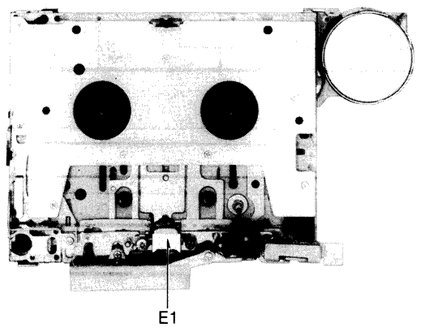
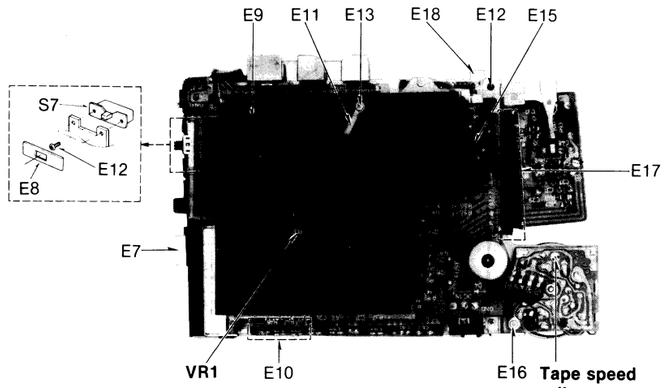
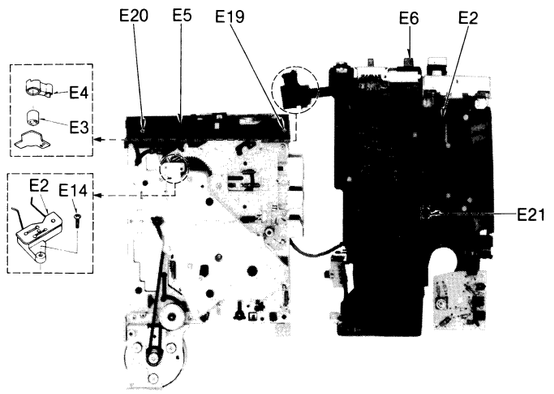



Fig. 12

# ELECTRICAL PARTS LOCATION



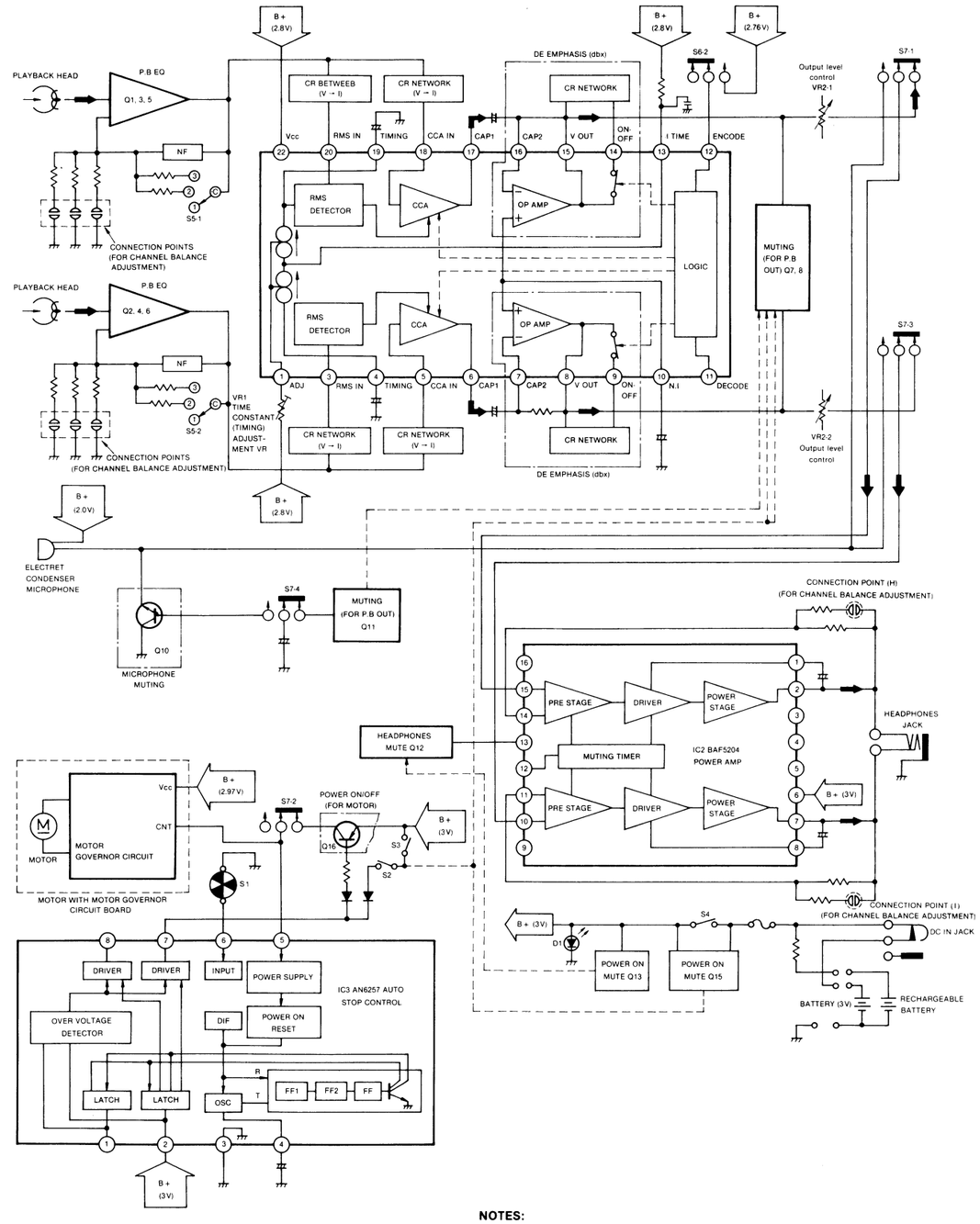




## REPLACEMENT PARTS LIST

| Ref No. | Part No. | Part Name & Description |
|---|---|---|
| | | **ELECTRICAL PARTS** |
| E 1 | QWY4142Y | Playback Head |
| E 2 | QES1533 | Brush Holder Assembly |
| E 3 | WM034BZ103 | Condenser Microphone |
| E 4 | QKJ0502 | Microphone Holder |
| E 5 | QKJ0501 | Holder |
| E 6 | QGT1562 | Switch Knob (for Pause) |
| E 7 | QYT0639W | Volume Knob |
| E 8 | QQC1735 | Shelter |
| E 9 | QTS1590 | Shield Plate |
| E 10 | QBH0081 | Insulating Sheet |
| E 11 | QTD1258 | Lug Terminal |
| E 12 | XQN16+A3FZ | Screw ⊕1.6×3 |
| E 13 | XQN16+A35FR | Screw ⊕1.6×3.5 |
| E 14 | XQN16+C4FY | Screw ⊕1.6×4 |
| E 15 | XTNQ16C4FFR | Screw ⊕1.6×4 |
| E 16 | QHQ1320 | Step Screw |
| E 17 | QBH0180 | Protection Sheet |
| E 18 | QYT0654 | Switch Knob (for dbx) |
| E 19 | XTNQ16C28F | Tapping Screw ⊕1.6×2.8 |
| E 20 | XTNQ16A3F | Screw ⊕1.6×3 |
| E 21 | QTW1242 | Insulating Sheet |



# BLOCK DIAGRAM




**NOTES:**
S1.....ROTARY SWITCH (ROTATING DETECTION).
S2.....PLAYBACK SWITCH (shown in OFF position).
S3.....FAST FORWARD/REWIND SWITCH (shown in OFF position).
S4.....POWER ON/OFF SWITCH (shown in OFF position).
S5.....TAPE SELECT SWITCH ((1) Normal Hi, (2) Normal Low: Metal Hi, (3) Metal Low).
S6.....dbx IN/OUT SWITCH (shown in IN position: (4) OUT, (6) IN).
S7.....PAUSE & MIC SWITCH (shown in OFF position).
(➡) this arrow indicates the flow of the playback signal.
(⇢) this arrow indicates the flow of the control signal.

**NOTES:** RESISTORS
- ERD...Carbon
- ERG...Metal-oxide
- ERS...Metal-oxide
- ERO...Metal-film
- ERX...Metal-film
- ERQ...Fuse type metallic
- ERC...Solid
- ERF...Cement

CAPACITORS
- ECBA.....Ceramic
- ECG□.....Ceramic
- ECK□.....Ceramic
- ECC□.....Ceramic
- ECF□.....Ceramic
- ECQM.....Polyester film
- ECQE.....Polyester film
- ECQF.....Polypropylene
- ECE□.....Electrolytic
- ECE□N ...Non polar electrolytic
- ECQS.....Polystyrene
- ECS□.....Tantalum
- QCS.....Tantalum

CHIP RESISTORS
- RRD.....Carbon

CHIP CAPACITORS
- QCU□.....Ceramic
- ECSE.....Tantalum

## REPLACEMENT PARTS LIST

| Ref No. | Part No. |
|---|---|
| **RESISTORS** | |
| R 1, 2 | RRD18XJ273 |
| R 3, 4 | RRD18XJ564 |
| R 5, 6 | RRD18XJ153 |
| R 7, 8 | RRD18XJ102 |
| R 9, 10 | RRD18XJ471 |
| R 11, 12 | RRD18XJ271 |
| R 13, 14 | RRD18XJ121 |
| R 15, 16 | RRD18XJ124 |
| R 17, 18 | RRD18XJ564 |
| R 19, 20 | RRD18XJ332 |
| R 21, 22 | RRD18XJ152 |
| R 23, 24 | RRD18XJ472 |
| R 25, 26 | RRD18XJ123 |
| R 27, 28 | RRD18XJ560 |
| R 29, 30 | RRD18XJ561 |
| R 31, 32 | RRD18XJ102 |
| R 33, 34 | RRD18XJ103 |
| R 35, 36 | RRD18XJ163 |
| R 37, 38 | RRD18XJ151 |
| R 39, 40 | RRD18XJ472 |
| R 41, 42 | RRD18XJ163 |
| R 43, 44 | RRD18XJ122 |
| R 45, 46 | RRD18XJ121 |
| R 47, 48 | RRD18XJ680 |
| R 49, 50 | RRD18XJ332 |
| R 53, 54 | RRD18XJ822 |
| R 55, 56 | RRD18XK4R7 |
| R 59, 60 | RRD18XJ102 |
| R 70 | RRD18XJ222 |
| R 71 | RRD18XJ102 |
| R 72 | RRD18XJ121 |
| R 73 | RRD18XJ104 |
| R 74 | RRD18XJ820 |
| R 75 | RRD18XJ273 |
| R 76 | RRD18XJ153 |
| R 77 | RRD18XJ102 |
| R 78 | RRD18XJ391 |
| R 79 | RRD18XJ820 |
| R 80 | RRD18XJ221 |
| R 81 | RRD18XJ331 |
| R 83 | RRD18XJ471 |
| R 84 | RRD18XJ820 |
| R 85 | RRD18XJ102 |
| R 86 | RRD18XJ822 |
| R 87 | RRD18XK330 |
| R 88 | RRD18XJ123 |
| R 89 | RRD18XJ104 |
| R 90 | RRD18XJ682 |
| R 91 | RRD18XJ102 |
| R 92 | RRD18XJ222 |
| R 93 | ERD25FJ3R7 |

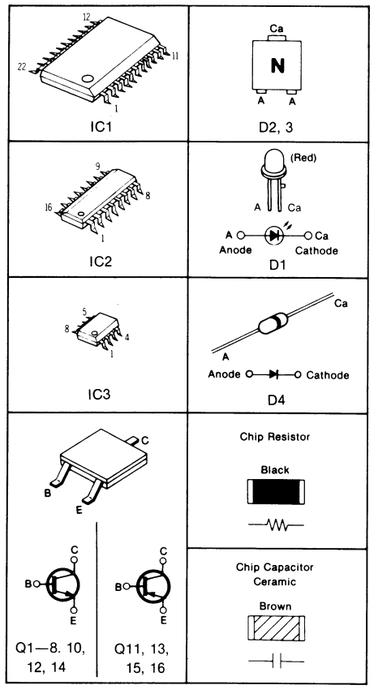
| Ref No. | Part No. |
|---|---|
| **VARIABLE RESISTORS** | |
| VR 1 | QVM42TB222SA |
| VR 2 | QVBL1HC03A24 |
| **CAPACITORS** | |
| C 1, 2 | ECSF1VM474 |
| C 3, 4 | QCUT1H102MRL |
| C 5, 6 | QCUT1H471MRL |
| C 7, 8 | ECEA1HKR47 |
| C 9, 10 | QCUX1E333KRX |
| C 11, 12 | ECEA1HKR33 |
| C 13 | ECSF1CM474 |
| C 14 | ECEA1HKR47 |
| C 15, 16 | QCUX1E333JRX |
| C 17, 18 | ECEA16Z10 |
| C 19, 20 | ECEA0GK470 |
| C 21, 22 | QCUT1H472JRL |
| C 23, 24 | QCUT1E223JRL |
| C 25, 26 | ECSF1CM474 |
| C 27, 28 | QCUT1H152MRL |
| C 29, 30 | ECEA0GK470 |
| C 31, 32 | ECEA0GK101 |
| C 33, 34 | QCUT1H103MRL |
| C 35, 36 | QCUT1H102MRL |
| C 37, 38 | ECEA0GK470 |
| C 39, 40 | QCUT1H102MRL |
| C 50 | QCUT1E104ZFL |
| C 51, 52 | ECEA0GK101 |
| C 53 | ECEA0JK220 |
| C 54 | ECEA1HK010 |

| Ref No. | Part No. |
|---|---|
| C 55 | ECEA1CK100 |
| C 56 | ECEA0GK221 |
| C 57 | ECEA0GK470 |
| C 58 | ECEA0GK221 |
| C 59, 60 | ECEA0JK220 |
| C 61 | ECEA1CK100 |
| C 62 | ECEA0JV471 |
| C 63 | ECEA0GK221 |
| C 64 | QCUT1H102MRL |
| C 65 | QCUT1H332MRL |
| **TRANSISTORS** | |
| Q 1, 2, 3, 4, 5, 6, 7, 8, 10 | 2SC2412 |
| Q 11 | 2SA1037 |
| Q 12 | 2SC2412 |
| Q 13 | 2SA1037 |
| Q 14 | 2SC2412 |
| Q 15, 16 | 2SA1037 |
| **DIODES & RECTIFIERS** | |
| D 1 | SLR34UR |
| D 2, 3 | DAN202TB |
| D 4 | SM112 |
| **INTEGRATED CIRCUITS** | |
| IC 1 | AN6291S |
| IC 2 | BAF5204LN |
| IC 3 | AN6257S |

| Ref No. | Part No. | Part Name & Description |
|---|---|---|
| | | **SWITCHES** |
| S 1 | refer to E2 & M63 | Combination Switch (Rotary Detector) |
| S 2, 3, 4 | QSB0274 | Leaf Switch (Play, FF/REW, Power ON/OFF) |
| S 5, 6 | QSS2302 | Slide Switch (Tape Setector, dbx IN/OUT) |
| S 7 | QSS4214 | Slide Switch (Pause/Mic ON) |
| | | **JACKS** |
| J 1 | QJA0173 | M3 Jack |
| J 2 | QJA0164 | DC IN Jack |

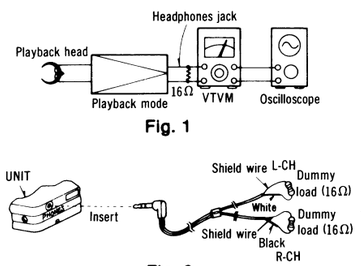
**NOTES:**
- S1.....Rotary detection switch.
- S2.....Playback ON/OFF switch (shown in OFF position).
- S3.....FF/REW ON/OFF switch (shown in OFF position).
- S4.....Power ON/OFF switch (shown in OFF position).
- S5-1, S5-2.....Tape select switch (shown in NORMAL (Hi) position).
  (1)...Normal (Hi)
  (2)...Normal (Low) & Metal (Hi)
  (3)...Metal (Low)
- S6.....dbx IN/OUT switch (shown in OUT position).
- S7-1—S7-4 .....PAUSE/MIC ON/OFF switch (shown in OFF position).
- VR1 .....Attack recovery time adjustment VR.
- VR2-1, 2-2 .....Volume controls.
- Connection points (B), (C), (D), (E), (F), (G)...For channel balance adjustment points.
- Connection points (H), (I)...For output balance adjustment points.
- Resistance are in ohms (Ω), 1/8 watt unless specified otherwise.
  1K = 1,000(Ω), 1M = 1,000K(Ω).
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- All voltage values shown in circuitry are under nosignal condition and volume control at minimum position.
  Unless otherwise specified, voltage measurement conditions are that tape travels is at PLAY, tape mode at NORMAL (Hi), and dbx switch at OUT.
  NO MARK .....Voltage at playback mode.
  ( ) .....Voltage value at IN (dbx switch) mode.
- ( ⇨ ) this arrow indicates the flow of the playback signal.
- ( ➡ ) this arrow indicates the flow of the talk signal.
- ( ⇒ ) this arrow indicates the flow of the playback and talk signal in combination.

## TERMINATIONS




## SPECIFICATIONS

| | |
|---|---|
| Playback frequency response<br>* Use test tape<br>··· QZZCFM | — dbx OUT —<br>315Hz: 0dB (30mV)<br>125Hz: −0.5±2dB<br>8kHz: 0.5±3dB<br>— dbx IN —<br>315Hz: 0dB (3mV)<br>125Hz: −1±3dB<br>8kHz: 9±5dB |
| Playback gain<br>* Use test tape<br>··· QZZCFM (315Hz/0dB) | Greater than 0.64V |

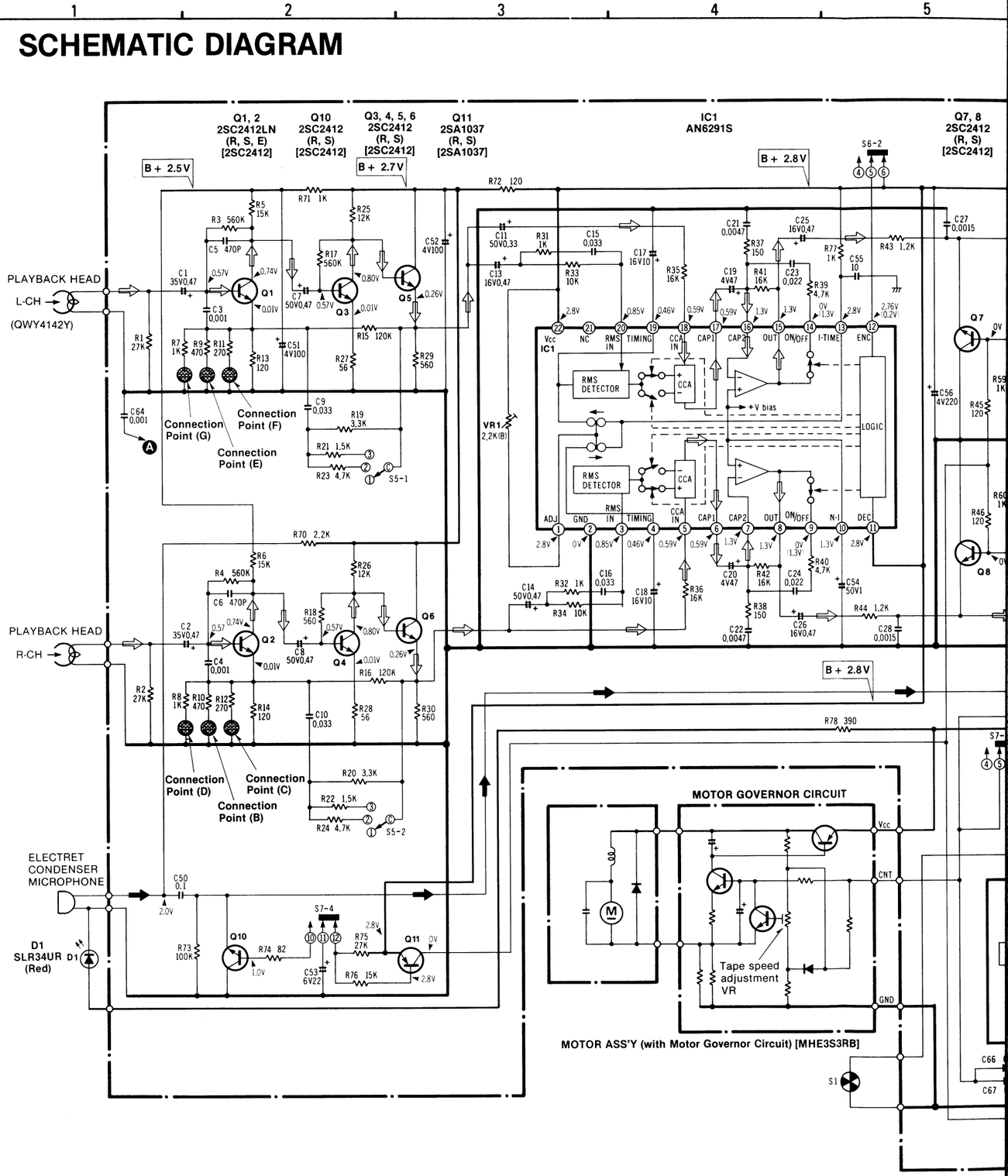



- Described in schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type number is used for supply parts number and production parts number which they are identical.
  e.g. **Q1**
  **2SC2412LN(R,S,E)—Production parts number**
  **[2SC2412]————Supply parts number**
- **The supply parts number is described alone in the replacement parts list.**

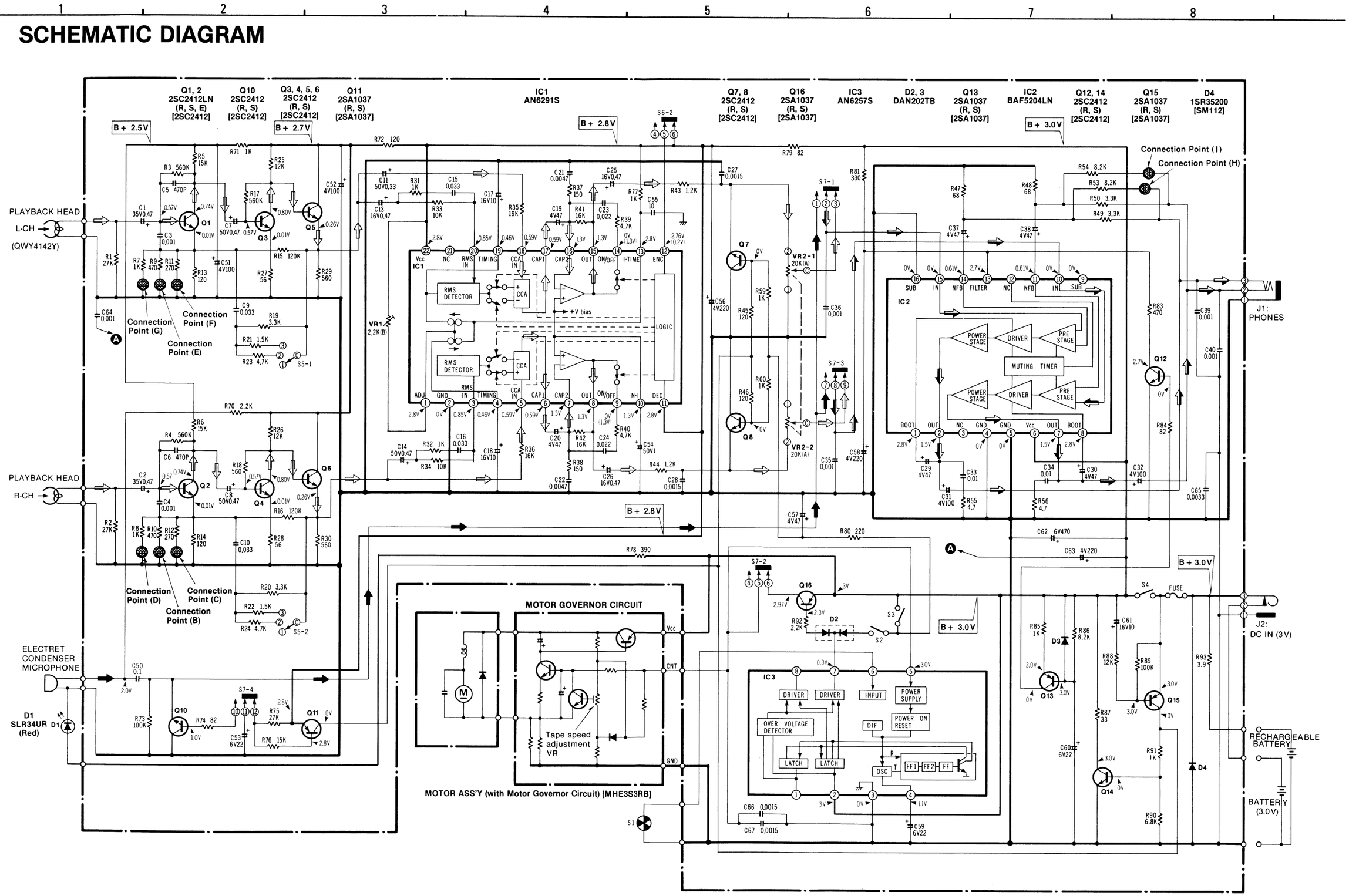
- **This schematic diagram may be modified at any time with the development of new technology.**

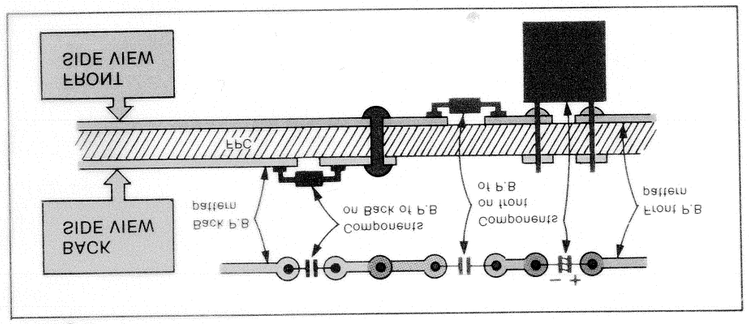


# SCHEMATIC DIAGRAM



# SCHEMATIC DIAGRAM






Example

- This circuit board digram may be modified at any time with the development of new technology.
- ( ) ..... Voltage value at IN (4pdx switch) mode. For measurement, use VTVM.
- All voltage values shown in circuitry are under normal condition and playback mode with volume control at minimum position.
- Values indicated in ☐ are DC voltage between the chassis and electrical of the printed circuit board.
- Voltage values shown in ☐ are measured values at the front battery side between conductors on the front side and back side of the circuit board.
- The symbols (●) shown in the circuit board indicate connection points
- Components on front of P.B are identified by plane symbols.
- Components on back of P.B are identified by black symbols. Front side of the circuit board, which is but the mechanism unit.
- The circuit shown in ▨ on the conductor indicates printed circuit on the back side of the printed circuit board.
- The circuit shown in ▨ on the conductor indicates printed circuit on the front side of the printed circuit board.

NOTES:



MICROPHONE CONDENSER ELECTRET

LED CIRCUIT BOARD (LPC)

D1

Q1, 2 2SC2412

| | |
|---|---|
| B | 0.57 V |
| C | 0.74 V |
| E | 0.01 V |

Q3, 4 2SC2412

| | |
|---|---|
| B | 0.57 V |
| C | 0.80 V |
| E | 0.01 V |

Q5, 6 2SC2412

| | |
|---|---|
| B | 0.80 V |
| C | 2.7 V |
| E | 0.26 V |

LOUD TERMINAL

BLK

HEADPHONES J1 : STEREO

Connection Point (A)
Connection Point (B)
Connection Point (C)
Connection Point (D)
Connection Point (E)
Connection Point (F)
Connection Point (G)
Connection Point (H)
Connection Point (I)

TERMINAL
BATTERY
RECHARGEABLE

BATTERY BOX

BATTERY TERMINAL (–)
BATTERY TERMINAL (+)

MOTOR GOVERNOR CIRCUIT BOARD

MOTOR

PLAYBACK HEAD

Q16 2SA1037

| | |
|---|---|
| B | 2.3 V |
| C | 2.97 V |
| E | 3 V |

S4 : Power SW
S2 : Play SW
S3 : Rew SW
S5 : 4pdx
WS 130 WD

IC2 BAF5204LN

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.8 V | 5 | 0 V | 9 | 0 V | 13 | 0 V | 16 | 0 V |
| 2 | 1.5 V | 6 | 3 V | 10 | 0 V | 14 | 0.61 V | 15 | 0 V |
| 3 | — | 7 | 1.5 V | 11 | 0.61 V | 12 | 2.8 V | 8 | 0 V |
| 4 | 0 V | | | | | | | | |

Q11 2SA1037

| | |
|---|---|
| B | 2.8 V |
| C | 0 V |
| E | 2.8 V |

Q15 2SA1037

| | |
|---|---|
| B | 3.0 V |
| C | 0 V |
| E | 3.0 V |

Q14 2SC2412

| | |
|---|---|
| B | 0 V |
| C | 3.0 V |
| E | 0 V |

Q13 2SA1037

| | |
|---|---|
| B | 3.0 V |
| C | 0 V |
| E | 3.0 V |

Q12 2SC2412

| | |
|---|---|
| B | 0 V |
| C | 2.7 V |
| E | 0 V |

MAIN CIRCUIT BOARD (TPC)

Q7, 8 2SC2412

| | |
|---|---|
| B | 0 V |

Q10 2SC2412

| | |
|---|---|
| B | 0 V |

IC3 AN6257S

| | |
|---|---|
| 1 | — |
| 2 | 3 V |
| 3 | 0 V |
| 4 | 1.1 V |
| 5 | 3.0 V |
| 6 | — |
| 7 | 0.3 V |
| 8 | — |

IC1 AN6291S

| | | | |
|---|---|---|---|
| 1 | 2.8 V | 12 | 2.76V (0.2V) |
| 2 | 0 V | 13 | 2.8 V |
| 3 | 0.85 V | 14 | 0 V (1.3V) |
| 4 | 0.46 V | 15 | 1.3 V |
| 5 | 0.59 V | 16 | 1.3 V |
| 6 | 0.59 V | 17 | 0.59 V |
| 7 | 1.3 V | 18 | 0.59 V |
| 8 | 1.3 V | 19 | 0.46 V |
| 9 | 0 V (1.3V) | 20 | 0.85 V |
| 10 | 1.3 V | 21 | — |
| 11 | 2.8 V | 22 | 2.8 V |

S1 : Rotary selection SW
S7 : Pause/mute SW
VR1 : Volume
VR2 : Tone
VR3 : Balance

NOTES:

| | |
|---|---|
| BLK | Black |
| BLU | Blue |
| BRN | Brown |
| GRY | Grey |
| GRN | Green |
| L.BLU | Light Blue |
| WHI | No Color Mark |
| ORG | Orange |
| PNK | Pink |
| RED | Red |
| SFD | Shield Wire |
| VLT | Violet |
| WHT | White |
| YEL | Yellow |

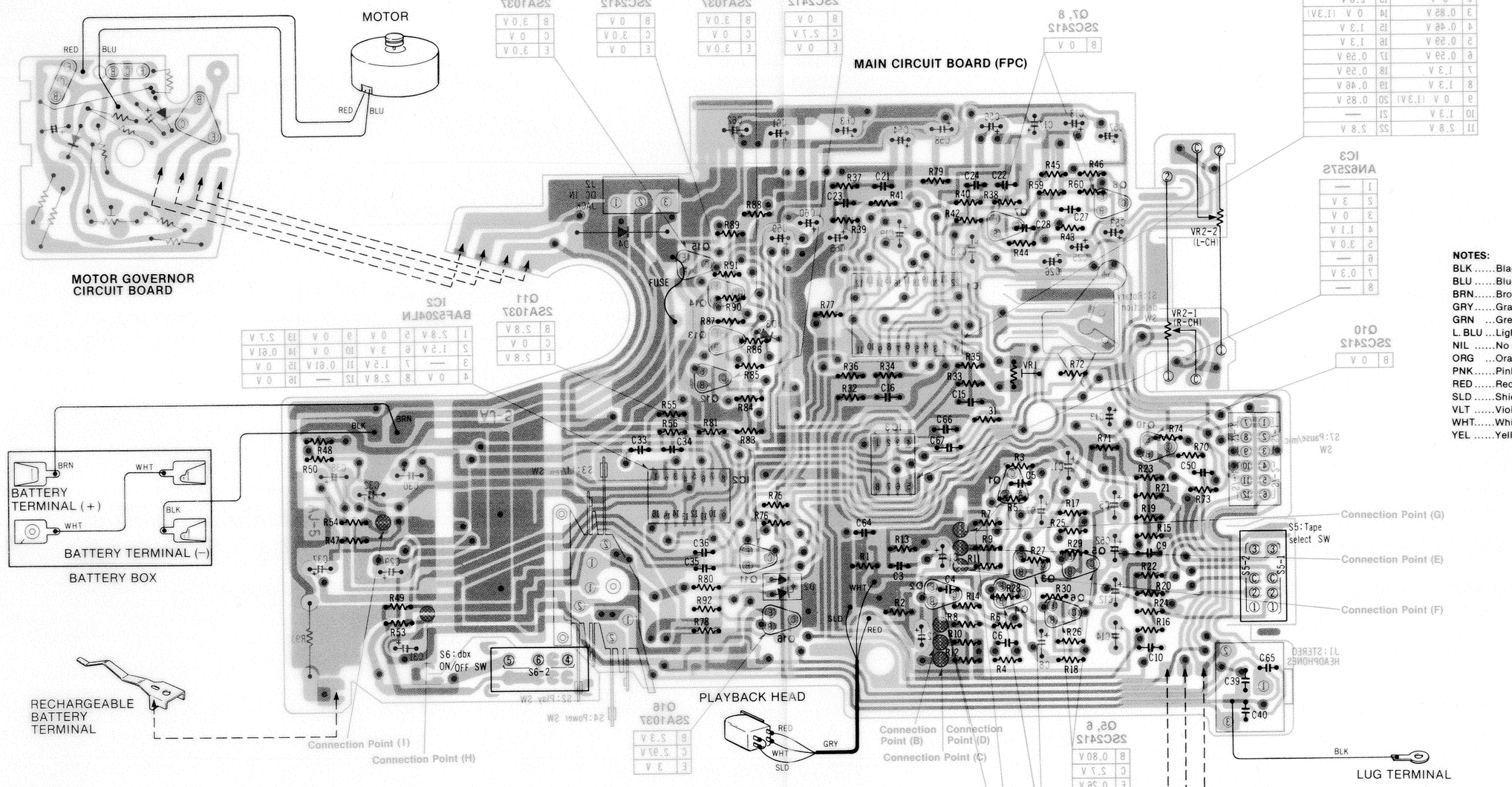
BACK SIDE VIEW

FRONT SIDE VIEW

# CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

# CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

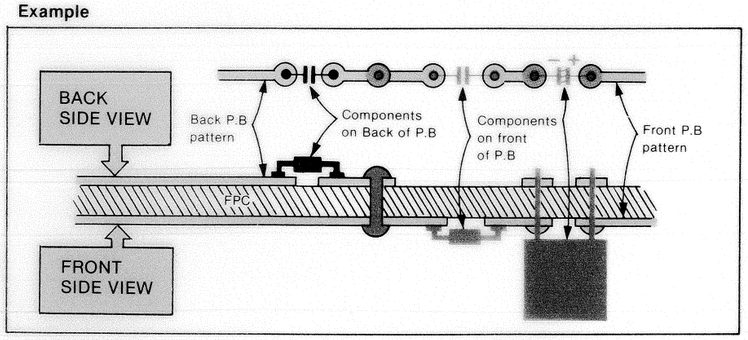
## BACK SIDE VIEW




**NOTES:**

BLK .....Black
BLU .....Blue
BRN.....Brown
GRY.....Gray
GRN ...Green
L. BLU ...Light Blue
NIL .....No Color Mark
ORG ...Orange
PNK.....Pink
RED.....Red
SLD .....Shield Wire
VLT .....Violet
WHT.....White
YEL .....Yellow

**Example**



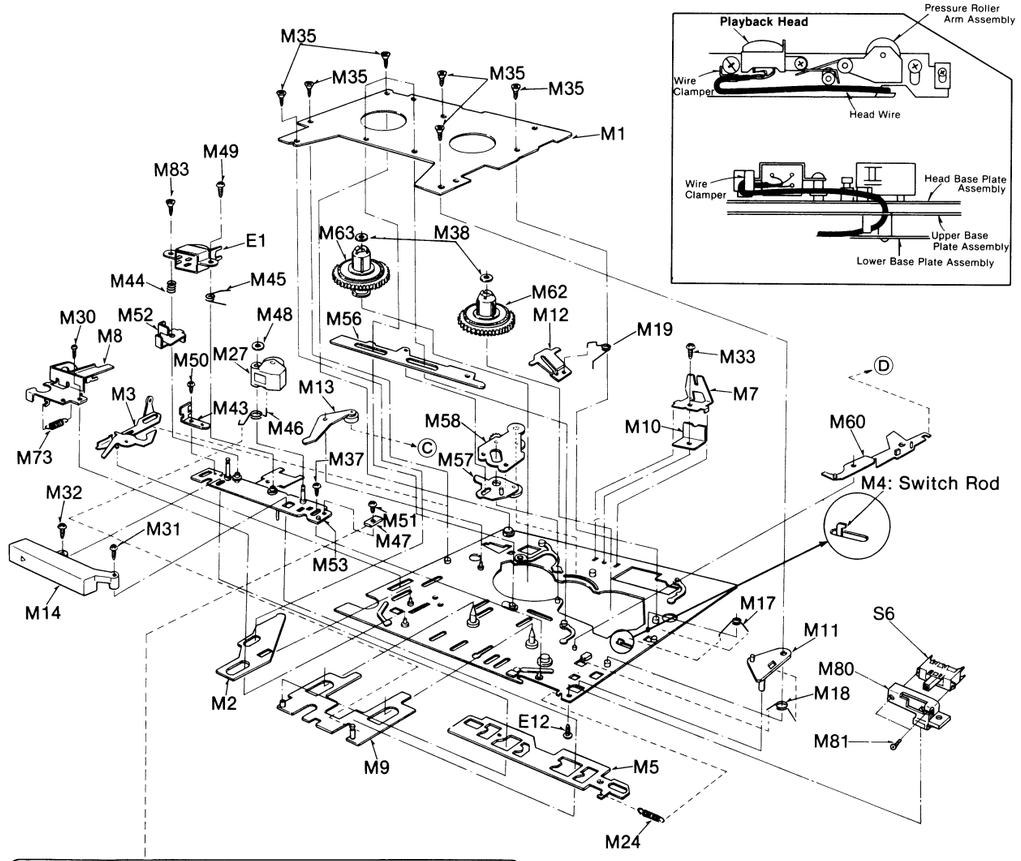

**NOTES:**

- The circuit shown in ▭ on the conductor indicates printed circuit on the back side of the printed circuit board.
- The circuit shown in ▭ on the conductor indicates printed circuit on the front side of the circuit board, which is put the mechanism unit.
- Components on back of P.B are identified by black symbols.
- Components on front of P.B are identified by blue symbols.
- The symbols (◉) snown in the circuit board indicate connection points between conductors on the front side and back side of the circuit board.
- Voltage values shown in ▭ are measured values at the front pattern side of the printed circuit board.
- Values indicates in ▭ are DC voltage betwdeen the chassis and electrical parts.
- All voltage values shown in circuitry are under nosignal condition and playback mode with volume control at minimum position. For measurement, use VTVM.
- ( )...Voltage value at IN (dbx switch) mode.

**• This circuit board diagram may be modified at any time with the development of new technology.**

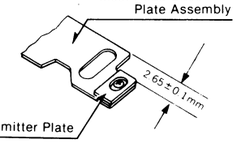
# MECHANICAL PARTS LOCATION

## (Top View)

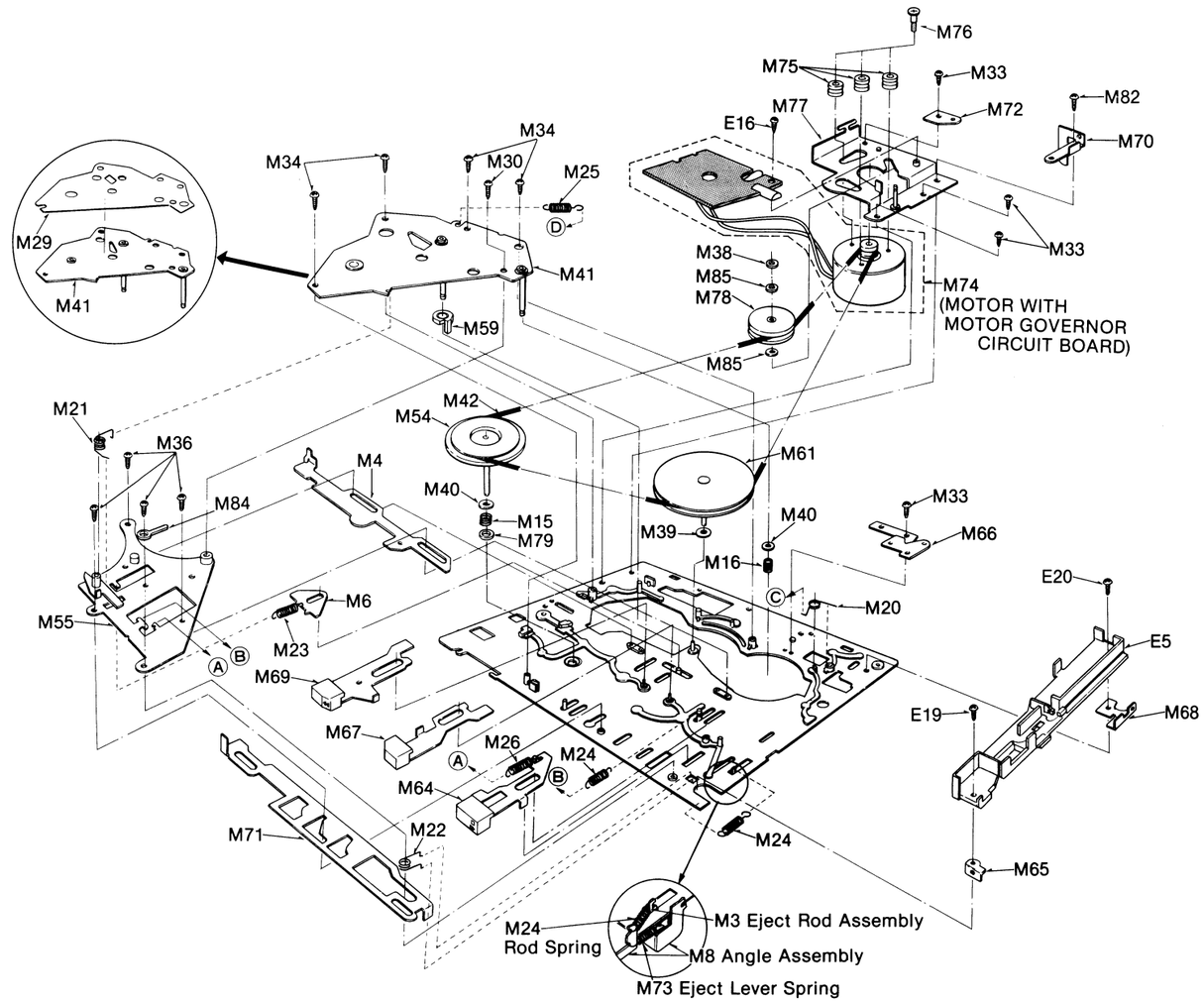



**Adjust the timing**

In FF/REW mode, the ON timing of the FF/REW switch (S3) is slightly delayed (compared with gear engagement timming) to prevent generation of mechanical noise. When the limiter plate (M47) is replaced, adjust the timing as shown in the figure.




## (Rear View)



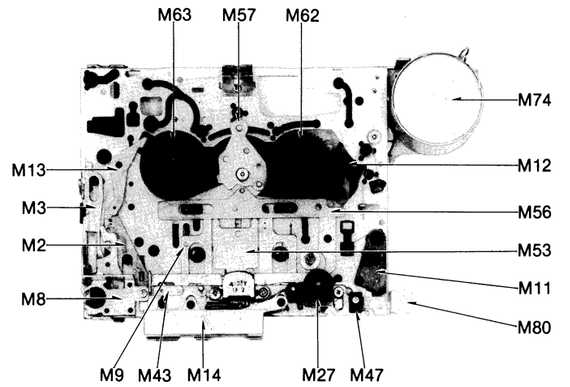

## REPLACEMENT PARTS LIST

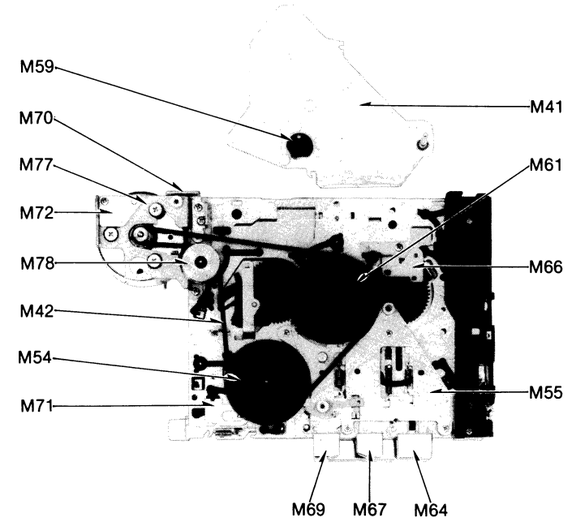
| Ref No. | Part No. | Part Name & Description |
|---|---|---|
| | | **MECHANICAL PARTS** |
| M 1 | QMK1940 | Chassis Cover |
| M 2 | QMR1962 | Stop Rod-2 |
| M 3 | QXR0789 | Eject Rod Assembly |
| M 4 | QMR1968 | Switch Rod |
| M 5 | QMR1970 | Lock Rod |
| M 6 | QML3836 | Fast Wind Control Rod |
| M 7 | QBP1937 | Cassette Retainer Spring |
| M 8 | QXA1198 | Counter Angle Assembly |
| M 9 | QXR0784 | Playback Rod Assembly |
| M 10 | QMA4381 | Cassette Holding Angle |
| M 11 | QML3844 | Switch Arm |
| M 12 | QML3451 | Auto-Stop Detection Lever |
| M 13 | QXL1509 | Brake Arm Assembly |
| M 14 | QGO1957W | Playback Button |
| M 15 | QBC1403 | Flywheel Spring |
| M 16 | QBC1404 | Back Tension Spring |
| M 17 | QBN1863 | Switch Rod Spring |
| M 18 | QBN1864 | Switch Arm Spring |
| M 19 | QBN1865 | Auto-Stop Detection Lever Spring |
| M 20 | QBN1866 | Brake Arm Spring |
| M 21 | QBN1867 | Cue Lever Spring |
| M 22 | QBN1876 | Changing Rod Return Spring |
| M 23 | QBT1950 | Control Lever Spring |
| M 24 | QBT1951 | Rod Spring |
| M 25 | QBT1952 | Lock Release Lever Spring |
| M 26 | QBT1954 | Playback Rod Spring |
| M 27 | QXL1511 | Pressure Roller Arm Assembly |
| M 29 | QTW1274 | Insulating Sheet |
| M 30 | XQN16+C3FY | Screw ⊕1.6×3 |
| M 31 | XQN16+C5FY | Screw ⊕1.6×5 |
| M 32 | QHQ1320 | Step Screw |
| M 33 | XTNQ16C3F | Tapping Screw ⊕1.6×3 |
| M 34 | XTNQ16C4JFY | Tapping Screw ⊕1.6×4 |
| M 35 | XTSQ16A4JFC | Tapping Screw ⊕1.6×4 |
| M 36 | XTNQ16C3J | Tapping Screw ⊕1.6×3 |
| M 37 | QHQ1293 | Head Adjustment Screw |
| M 38 | QBW2030 | Nylon Washer |
| M 39 | QBW2010 | Poly Washer |
| M 40 | QBW2012 | Poly Washer |
| M 41 | QXK2544 | Lower Base Plate Assembly |
| M 42 | QDB0315 | Flywheel Belt |
| M 43 | QMG0108 | Tape Guide |
| M 44 | QBC1339 | Head Adjustment Spring |
| M 45 | QBN1861 | Playback Spring |
| M 46 | QBN1862 | Pressure Roller Spring |
| M 47 | QZM0048 | Limitter Plate |
| M 48 | QBW2008 | Poly Washer |
| M 49 | XSN2+4 | Screw ⊕2×4 |
| M 50 | XQS16+A18FC | Screw ⊕1.6×1.8 |
| M 51 | XQN16+C18FY | Screw ⊕1.6×1.8 |
| M 52 | QTD1302 | Wire Clamper |
| M 53 | QXK2546 | Head Base Plate Assembly |
| M 54 | QXF0185N | Flywheel Assembly |
| M 55 | QXK2547 | Rod Base Plate Assembly |
| M 56 | QXR0781 | Control Rod Assembly |
| M 57 | QXL1279N | Takeup Gear Lever Assembly |
| M 58 | QXL1508 | Fast Wind Gear Lever Assembly |
| M 59 | QMD0022 | Auto-Stop Cam |
| M 60 | QXL1510 | Lock Release Lever Assembly |
| M 61 | QXG1064 | Main Gear Assembly |
| M 62 | QXD0128 | Takeup Reel Table Assembly |
| M 63 | QXD0134 | Supply Reel Table Assembly |
| M 64 | QXR0861 | Stop Rod Assembly |
| M 65 | QMA4331 | Mechanism Holding Plate-A |
| M 66 | QMA4308 | Switch Angle |
| M 67 | QXR0862 | Rewind Rod Assembly |
| M 68 | QMA4332 | Mechanism Holding Plate-B |
| M 69 | QXR0863 | Fast Forward Rod Assembly |
| M 70 | QMA4333 | Mechanism Holding Plate-C |
| M 71 | QMR1967 | Changing Rod |
| M 72 | QMF2233 | Stopper |
| M 73 | QBT1953 | Eject Lever Spring |
| M 74 | MHE3S3RB | Motor Assembly (with Motor Governor P.C.B) |
| M 75 | QBG1676 | Motor Rubber |
| M 76 | QHQ1302 | Step Screw |
| M 77 | QXA1200 | Motor Holding Plate Assembly |
| M 78 | QXP0631 | Pulley |
| M 79 | QBW2102 | Washer |
| M 80 | QMA4507 | Switch Angle |
| M 81 | XQS16+3 | Screw ⊕1.6×3 |
| M 82 | XTNQ16A3F | Tapping Screw ⊕1.6×3 |
| M 83 | QHQ1333 | Step Screw |
| M 84 | QTD1258 | Lug Terminal |
| M 85 | QBW2101 | Poly Washer |

## SPECIFICATIONS

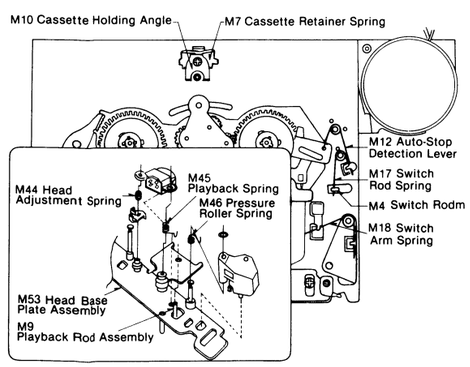
| | |
|---|---|
| Pressure of pressure roller | $220^{+30}_{-40}$ g |
| Takeup tension<br>• Use cassette torque meter ··· QZZSRKCT | 35±10 g-cm |
| Wow and flutter: JIS<br>• Use test tape ··· QZZCWAT | Less than 0.4% (RMS) |

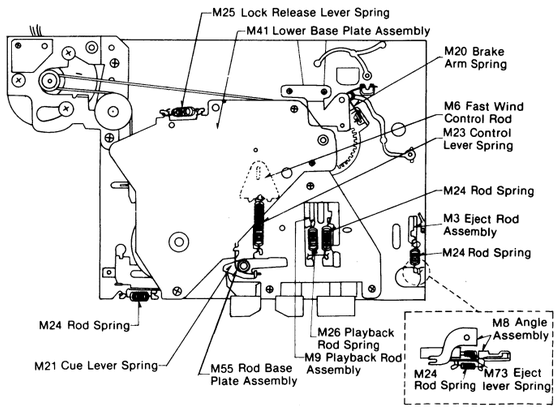
# MECHANICAL PARTS LOCATION



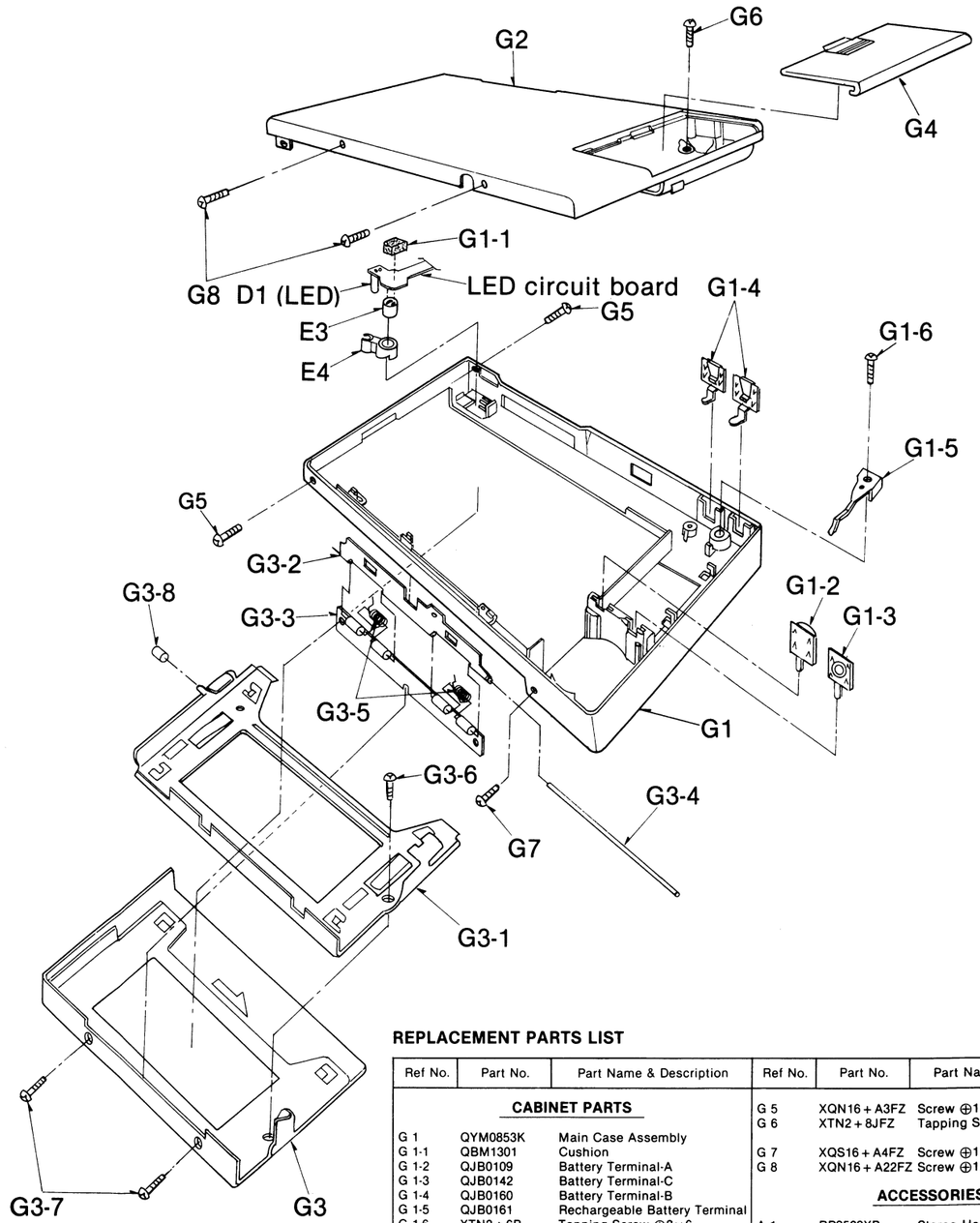

# SPRING LOCATION






# CABINET PARTS LOCATION




## REPLACEMENT PARTS LIST

| Ref No. | Part No. | Part Name & Description |
|---|---|---|
| | | **CABINET PARTS** |
| G 1 | QYM0853K | Main Case Assembly |
| G 1-1 | QBM1301 | Cushion |
| G 1-2 | QJB0109 | Battery Terminal-A |
| G 1-3 | QJB0142 | Battery Terminal-C |
| G 1-4 | QJB0160 | Battery Terminal-B |
| G 1-5 | QJB0161 | Rechargeable Battery Terminal |
| G 1-6 | XTN2+6B | Tapping Screw ⊕2×6 |
| G 2 | QKM1553K | Bottom Case Assembly |
| G 3 | QYF0572H | Cassette Lid Assembly |
| G 3-1 | QXA1237 | Cassette Holder |
| G 3-2 | QKC1091K | Hinge-A |
| G 3-3 | QKC1092K | Hinge-B |
| G 3-4 | QMN8031 | Cassette Lid Shaft |
| G 3-5 | QBN7012K | Cassette Lid Spring |
| G 3-6 | XQN16+A16FN | Screw ⊕1.6×1.6 |
| G 3-7 | XQS16+A4FZ | Screw ⊕1.6×4 |
| G 3-8 | QKJ0524 | Collar |
| G 4 | QKF4046K | Battery Cover |
| G 5 | XQN16+A3FZ | Screw ⊕1.6×3 |
| G 6 | XTN2+8JFZ | Tapping Screw ⊕2×8 |
| G 7 | XQS16+A4FZ | Screw ⊕1.6×4 |
| G 8 | XQN16+A22FZ | Screw ⊕1.6×2.2 |
| | | **ACCESSORIES** |
| A 1 | RP9529XP | Stereo Headphones Assembly |
| A 2 | QFK0192 | Carrying Bag |
| A 3 | QZC0020 | Shoulder Belt |
| A 4 | QQT3366 | Instruction Book |
| | | **PACKINGS** |
| P 1 | QPN4368 | Inside Carton |
| P 2 | QPA0649 | Cushion |
| P 3 | QPS0604 | Pad |
| P 4 | QPC0083 | Poly Sheet |
| P 5 | XZB14X25A02 | Poly Bag (for UNIT) |



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